

Create Your Own Density Bottle

(Density Project Due: Tuesday, Nov 29)

Take a picture of yourself with it and bring it in early if you finish early – sometimes the layers don't last very long.

Project Directions:

1. Carefully clean an empty clear plastic soda, juice, or water bottle (should be around 500 mL). Keep the cap to seal it later. Let the bottle dry completely. Put your name on the bottom of the Bottle on a piece of masking tape (The bottle can not be colored it needs to be clear)
2. Using your knowledge of the density of various liquids and solids that we have studied: create a visually pleasing “density bottle.” You will need liquids or solid objects that will form separate layers when poured into the bottles. Be careful **not to use** liquids that will mix together. *** Be sure to get permission from an adult before using any substance, and try them out in small amounts first so you do not waste them.*** Use food coloring if necessary to make layers stand out.
3. On an unlined sheet of paper (with the proper heading at the top- Name, Period, and Date) draw a colored diagram of your bottle and label its contents. Make sure that you include everything that you included in your bottle.
4. Type a summary to staple to the diagram detailing the reasons why you selected the liquids and solids that you used to make up your density bottle. Explain also, using comparisons of their densities, why they floated where they did. This summary should include a discussion of **all liquids** and **all solids** included in your project for full credit (12 to 16 sentences). *If you have trouble accessing a computer or printer you may very neatly write your explanation in pen.*
5. Take care to make it look nice, it's a **VISUAL** project!!!



Extra Credit: For extra credit find the actual densities of each object that you have used in your density bottle. You should show your calculations and or sources where you found your information, to receive the extra credit.

Substance Suggestions:

Substances you can find at home to help get you started (You are not limited to just using these! **However, * Be sure to get permission from an adult before using any substance, and try them out in small amounts first so you do not waste them.***):

Liquids:

Vegetable Oil	Hand Soap
Baby Oil	Laundry detergent
Water	Rubbing Alcohol
Vinegar	Acetone (Nailpolish Remover)
Shampoo	Light Corn Syrup
Molasses	Juice
Honey	Dish Soap

Solids:

Coins
Metal Hardware (nails, bolts, etc)
Rubber (Eraser)
Plastic toys
Pieces of food containers
Styrofoam
Plastic films

Cardboard

Visual Guide: Remember, for full credit your bottle needs 4 (or more) layers and 3 (or more) solids resting at different layers in your bottle.

Grading Rubric:

Exceeds the Standard (4 points each)	Meets the Standard (3 points each)	Approaching the Standard (2 points each)	Not at Standard (1 point each) (0 points for any missing items)
Outstanding Results <input type="checkbox"/> More than four separate layers <input type="checkbox"/> More than 3 solid objects (in different positions.) <input type="checkbox"/> Clear and colorful separation <input type="checkbox"/> Detailed colored diagram <input type="checkbox"/> Well written summary clearly explaining your reasoning and how density explains all substance locations.	Very Good Results <input type="checkbox"/> Four separate layers <input type="checkbox"/> 3 solid objects (in different positions) <input type="checkbox"/> Clear separation <input type="checkbox"/> Complete colored diagram <input type="checkbox"/> Well written summary clearly explaining your reasoning and how density explains all but one substance location.	Fair Results <input type="checkbox"/> Three separate layers <input type="checkbox"/> A couple solid objects (in at least 2 different positions) <input type="checkbox"/> Unclear separation <input type="checkbox"/> Incomplete colored diagram. <input type="checkbox"/> Summary of reasons for choices, correct explanation of how density explains their location. Missing explanation of more than one substance.	Poor Results <input type="checkbox"/> Three or more separate layers that are not visually pleasing and/or less than 3 layers. <input type="checkbox"/> One Solid Object <input type="checkbox"/> Very unclear or no separation <input type="checkbox"/> Missing much detail on diagram (not colored, missing most labels) <input type="checkbox"/> Explanation is not accurate and shows no understanding of density

Total Points:

- A 18 to 20 points
- B 16 to 17 points
- C - 14 to 15 points
- D - 12 to 13 points
- F Below 11 points

